

IN THE SPECIFICATION

Please delete the three paragraphs of the Abstract of the disclosure, as filed, and replace same with the following:

The present invention relates to a smart pipette for bio-cell manipulation which can freely change orientation of a bio-cell subject to the manipulation by using mechanical friction and applying instantaneous impact when penetrating the subject bio-cell while receiving real-time feedback of force/torque information of the bio-cell. Further, the present invention relates to a bio-cell manipulation method and system using a smart pipette, through which a bio-cell may be manipulated upon the application of the force/torque information generated during the cell manipulation to the smart pipette control. According to the present invention, injection position can be recognized precisely and conveniently regardless of the proficiency of the manipulating person. Thus, the bio-cell manipulation may be automated. Further, the smart pipette quantifies force/torque information feed-backed through the sensor unit and compares it with data acquired in advance through experiments on the same bio-cell. Further, through conducting impact driving when necessary, the present invention makes it possible to conduct bio-cell manipulation with minimum physical damage.